VOLUME 51 · PART 1 · FEBRUARY 1994 JPLPBZ 51 (Pt 1) 1-176 (1994) 0022-3778





JOURNAL OF PLASMA PHYSICS exists for the publication of experimental and theoretical research papers on plasma physics and its applications.

EDITOR

DR J. P. DOUGHERTY Department of Applied Mathematics and Theoretical Physics, University of Cambridge, Silver Street, Cambridge CB3 9EW, England

> ASSOCIATE EDITORS PROF. E. INFELD Soltan Institute, Hoża 69, Warsaw, PL 00681, Poland

PROF. P. K. KAW Institute for Plasma Research, Bhat, Gandhinagar 382 424, India

PROF. D. B. MELROSE Research Centre for Theoretical Astrophysics, School of Physics, The University of Sydney, Sydney NSW 2006, Australia

PROF. G. J. PERT

Department of Physics, University of York, Heslington, York YO1 5DD, England

DR PADMA K. SHUKLA Institut für Theoretische Physik IV, Ruhr-Universität Bochum, D-44780 Bochum 1, Germany

DR GARY ZANK Bartol Research Institute, University of Delaware, Newark DE 19716–4793, UŞA

© Cambridge University Press 1994

Copying

This journal is registered with the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923. Organizations in the USA who are also registered with C.C.C. may therefore copy material (beyond the limits permitted by sections 107 and 108 of US copyright law) subject to payment to C.C.C. of the per copy fee of 05.00. This consent does not extend to multiple copying for promotional or commercial purposes. Code 0022-3778/94 5.00 + .00.

ISI Tear Sheet Service, 3501 Market Street, Philadelphia, Pennsylvania 19104, USA, is authorized to supply single copies of separate articles for private use only.

Organizations authorized by the Copyright Licensing Agency may also copy material subject to the usual conditions.

For all other use, permission should be sought from Cambridge or the American Branch of Cambridge University Press.

JOURNAL OF PLASMA PHYSICS (ISSN 0022-3778) is published once every two months in February, April, June, August, October and December, by Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU and Journals Department, 40 West 20th Street, New York, NY 10011-4211.

Three parts form a volume. The subscription price (excluding VAT, but includes postage) of Volumes 51 and 52 (1994) is £144.50 net, per volume (US \$275.00 in the USA, Canada and Mexico) for institutions; £88.50 (US \$190.00) per volume for individuals. Single parts cost £50.00 each (US \$95.00 in the USA, Canada and Mexico) plus postage. All orders must be accompanied by payment.

Copies of the journal for subscribers in the USA, Canada and Mexico are sent by air to New York to arrive with minimum delay.

EC subscribers (outside the UK) who are not registered for VAT should add VAT at their country's rate. VAT registered subscribers should provide their VAT registration number.

Japanese prices for institutions (including ASP delivery) are available from Kinokuniya Company Ltd, P.O. Box 55, Chitose, Tokyo.

Second class postage paid at New York, NY, and at additional mailing offices. *POSTMASTER*: send address changes in USA, Canada and Mexico to *Journal of Plasma Physics*, Cambridge University Press, 110 Midland Avenue, Port Chester, New York, NY 10573-4930.